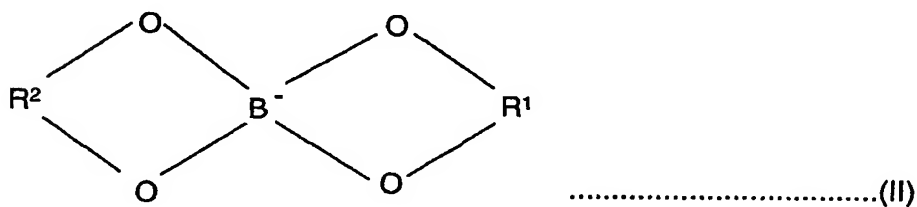


CLAIMS

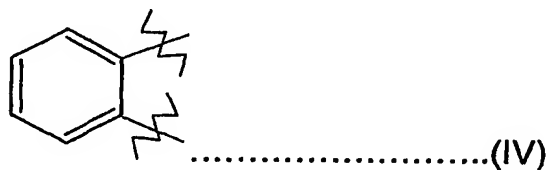
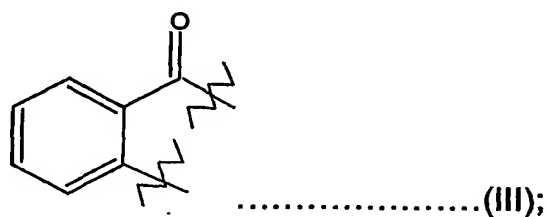
1. A carbonylation process comprising reacting at least one unsaturated reactant in the form of a compound having an aliphatic moiety with at least one unsaturated carbon-carbon bond; carbon monoxide; and a nucleophilic co-reactant in the presence of a Group VIII metal catalyst to produce a product containing a single unit of the unsaturated reactant in its reacted form; wherein the catalyst is prepared by the reaction of
- 5
- i) a source of Group VIII metal;
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- ii) a ligating compound to coordinate to the Group VIII metal, which ligating compound includes at least one atom selected from phosphorus, arsenic and antimony; and
- iii) an anion or a source thereof of general formula (II)



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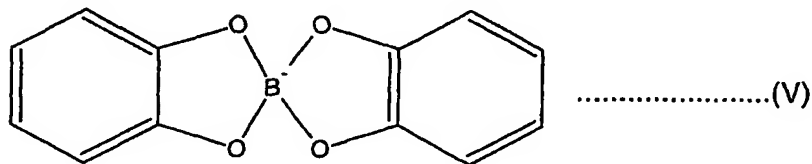
wherein R<sup>1</sup> and R<sup>2</sup> are the same or different and each comprises an organic group.

2. The process of claim 1 wherein both of  $R^1$  and  $R^2$  comprise an aromatic compound or a heteroaromatic compound.
3. The process of claim 1 wherein  $R^1$  and  $R^2$  independently comprises a  
5 compound selected from the group consisting of  $C_1$  to  $C_6$  alkylene; ortho-phenylene; biphenylene; a moiety of formula (III); a moiety of formula (IV);



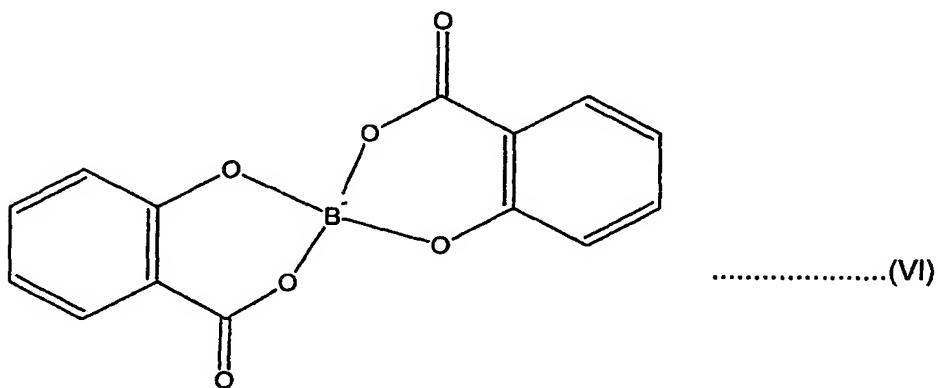
and a substituted derivative of any one of said compounds.

4. The process of claim 1 wherein the anion comprises the compound (V)



or a substituted derivative thereof.

5. The process of claim 1 wherein the anion comprises the compound (VI)



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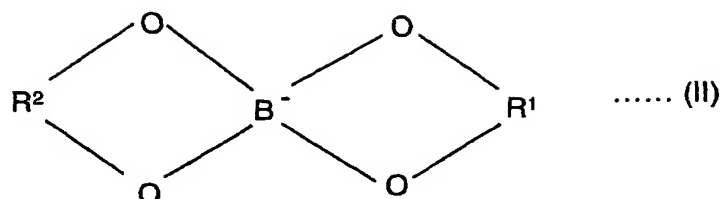
or a substituted derivative thereof.

6. The process of any one of the preceding claims wherein the anion or source thereof is prepared *in situ* by a condensation reaction between boric acid and a suitable precursor of R<sup>1</sup> and R<sup>2</sup>.
7. The process of any one of the preceding claims wherein the carbonylation process is a process for preparing esters in which case the nucleophilic co-reactant comprises an alcohol.

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8. The process of claim 7 which is for the preparation of methyl propionate wherein the unsaturated reactant comprises ethylene and the alcohol comprises methanol.
- 5 9. The process of any one of the preceding claims wherein the Group VIII metal comprises palladium.
- 10 10. The process of claim 9 wherein the catalyst is prepared *in situ*.
- 11 11. The process of any one of the preceding claims wherein the ligating compound comprises a compound of general formula (VII)
- $P(R^3 R^4 R^5) \text{ ----- (VII)}$
- 15 wherein  $R^3$ ,  $R^4$  and  $R^5$  are the same or different and are independently organyl groups.
12. The process of claim 11 wherein the ligating compound comprises  $PPh_3$ .
13. The process of any one of the preceding claims which is carried out in a solvent.
- 20 14. Use of anion or source thereof of general formula (II)



wherein  $R^1$  and  $R^2$  are the same or different and each comprises an organic group;

in a carbonylation process comprising reacting at least one unsaturated reactant in the form of a compound having an aliphatic moiety with at least one unsaturated carbon-carbon bond; carbon monoxide; and a nucleophilic co-reactant in the presence of a Group VIII metal catalyst to produce a product containing a single unit of the unsaturated reactant in its reacted form; wherein the catalyst is prepared by the reaction of

- i) a source of Group VIII metal;
- ii) a ligating compound to coordinate to the Group VIII metal, which ligating compound includes at least one atom selected from phosphorus, arsenic and antimony; and
- (iii) the anion or a source thereof of general formula (II);

thereby to reduce the formation of inactive salts of the ligating compound.

15. The use of claim 14 wherein the reduction in the formation of inactive salts of the ligating compound is compared to the same reaction under the same conditions wherein the source of anion or anion is replaced with

methanesulphonic acid.

16. A carbonylation process substantially as herein described with reference to the accompanying examples 1, 2 and 5.

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17. The use of anion in a carbonylation process substantially as herein described with referent to examples 1, 2 and 5.

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